ABSTRACT OF THE DISCLOSURE

Digital circuits with time multiplexed redundancy and methods and apparatuses for their automated designs generated from single-channel circuit designs. At least one embodiment of the present invention includes a digital circuit which detects or corrects transitory upsets through time-multiplexed resource sharing. In one embodiment of the present invention, time-multiplexed resource sharing is used to reduce the die area for implementing modular redundancy. One embodiment of the present invention automatically and efficiently synthesizes multi-channel hardware for time-multiplexed resource sharing by automatically generating a time-multiplexed design of multi-channel circuits from the design of a single-channel circuit, in which at least a portion of the channels are allocated for modular redundancy.